This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1 (currently amended): A method of balancing a rotating machinery having multiple non-coaxial shafts, each shaft having two correction planes, ~~said~~ the rotating machinery having an inner frame, an outer casing, and counterweights connected with a shaft of ~~said~~ the rotating machinery, said method comprising:

mounting a proximity probe on ~~said~~ the outer casing, ~~said~~ the proximity probe configured to provide phase readings to a phase reading output channel, wherein ~~said~~ the phase reading is measured in degrees measured with respect to a key phasor;

mounting a first plurality of velocity transducers on ~~said~~ the inner frame, each of ~~said~~ the velocity transducers configured to provide a first plurality of velocity signals to a first plurality of velocity signal output channels;

mounting a second plurality of velocity transducers on ~~said~~ the outer casing, each of ~~said~~ the velocity transducers configured to provide a second plurality of velocity signals to a second plurality of velocity signal output channels;

connecting ~~said~~ the phase reading output channel, ~~said~~ the first and second plurality of velocity signal output channels to a data acquisition system;

collecting vibration data for a number data channels, corresponding to measurement planes, that are less than the number of correction planes, provided by ~~said~~ the phase reading output channel, and ~~said~~ the first and second plurality of velocity signal channels, using ~~said~~ the data acquisition system;

removing ~~said~~ the outer casing to allow access to ~~said~~ the counterweights; and

adjusting ~~said~~ the counterweights using a predetermined rotor influence coefficient to reduce said vibration below an acceptable threshold level.

2 (Currently Amended): The method of claim 1 wherein ~~said~~ the rotating machinery is a three-shaft scroll pump.

3 (Currently Amended): The method of claim 1 wherein said mounting ~~said~~ the proximity probe includes connecting ~~said~~ the proximity probe to ~~said~~ the outer casing.

4 (Currently Amended): The method of claim 1 wherein ~~said~~ the first plurality of velocity transducers comprises ~~at least~~ two velocity transducers which are installed 90 degrees from each other, in order to provide velocity data in two planes, and wherein one of ~~said~~ the at least two velocity transducers is oriented in the direction of the key phasor.

5 (Currently Amended): The method of claim 1 wherein ~~said~~ the second plurality of velocity transducers comprises ~~at least~~ two velocity transducers which are installed 90 degrees from each other, in order to provide velocity data in two planes, and wherein one of ~~said~~ the at least two velocity transducers is oriented in the direction of the key phasor.

6 (Currently Amended): The method of claim 1 wherein said collecting said vibration data comprises collecting amplitude, velocity, and phase angle data, wherein ~~said~~ the phase angle is measured in degrees from said key phasor.

7 (Currently Amended): The method of claim 1 wherein said collecting said vibration data comprises collecting amplitude, velocity, and phase angle data, for start up, steady state and coast down operating conditions, and wherein ~~said~~ the rotating machinery is operating near a resonant condition during said steady state operating condition.

8 (Currently Amended): The method of claim 1 wherein ~~said~~ the shaft is one of three shafts and wherein said counterweights comprise upper and a lower counterweights, wherein each of said shafts is connected with an upper counterweight and a lower counterweight, and wherein said upper and lower counterweights are mounted near the ends of each of said shafts.

9 (Currently Amended): The method of claim 1 wherein said adjusting ~~said~~ the counterweights includes adding correction weights to and removing correction weights from ~~said~~ the counterweights.

10 (Currently Amended): The method of claim 1 wherein said adjusting ~~said~~ the counterweights includes adding correction weights to and removing correction weights from ~~said~~ the counterweights, and wherein said adjusting primarily comprises said removing when an indicated vibration is in alignment with said counterweights, and wherein said adjusting primarily comprises said adding when an indicated vibration is not alignment with ~~said~~ the counterweights.

11 (Currently Amended): The method of claim 1 wherein ~~said~~ the predetermined rotor influence coefficient is obtained from an equivalent rotating machinery, and wherein an equivalent rotating machinery is a rotating machinery operating substantially at resonance.

12 (Currently Amended): The method of claim 1 wherein ~~said~~ the rotor influence coefficient provides a measure for said adjusting ~~said~~ the counterweights, and wherein ~~said~~ the measure is a weight adjustment per a vibration displacement and a weight placement angle value measured with respect to the location of the maximum vibration displacement.

13 (Currently amended): A system for balancing a rotating machinery having multiple shafts that are not coaxial and each shaft having two correction planes, ~~said~~ the rotating machinery having an inner frame, an outer casing, and counterweights connected with a shaft of said rotating machinery, said system comprising:

a proximity probe configured to be mounted on ~~said~~ the outer casing of ~~said~~ the rotating machinery, said proximity probe configured to provide phase readings to a phase reading output channel, wherein said phase reading is measured in degrees measured with respect to a key phasor, located on one of said shafts;

a first plurality of velocity transducers configured to be mounted on ~~said~~ the inner frame of ~~said~~ the rotating machinery, each of said velocity transducers configured to provide a first plurality of velocity signals to a first plurality of velocity signal output channels;

a second plurality of velocity transducers configured to be mounted on ~~said~~ the outer casing of ~~said~~ the rotating machinery, each of said velocity transducers configured to provide a second plurality of velocity signals to a second plurality of velocity signal output channels;

a data acquisition system for receiving said phase reading output channel, said first and second plurality of velocity signal output channels, wherein the number of data channels corresponding to measurement planes is less than the number of corrections planes; and

counterweights configured to be applied to ~~said~~ the shaft of ~~said~~ the rotating machinery using a predetermined rotor influence coefficient.

14 (Currently amended): The system of claim 13 wherein ~~said~~ the rotating machinery is a three-shaft scroll pump.

15 (original): The system of claim 13 wherein said first plurality of velocity transducers comprises at least two velocity transducers which are installed 90 degrees from each other, in order to provide velocity data in two planes, and wherein one of said at least two velocity transducers is oriented in the direction of the key phasor.

16 (original): The system of claim 13 wherein said second plurality of velocity transducers comprises at least two velocity transducers which are installed 90 degrees from each other, in order to provide velocity data in two planes, and wherein one of said at least two velocity transducers is oriented in the direction of the key phasor.

17 (currently amended): The system of claim 13 wherein said data acquisition system ~~os~~ is configured to collect vibration data comprising amplitude, velocity, and phase angle data, for start up, steady state and coast down operating conditions, and wherein said rotating machinery is operating near a resonant condition during ~~said~~ the steady state operating condition.

18 (currently amended): The system of claim 13 wherein ~~said~~ the shaft is one of three shafts and wherein said counterweights comprise upper and a lower counterweights, wherein each of ~~said~~ the shafts is connected with an upper counterweight and a lower counterweight, and wherein said upper and lower counterweights are mounted near the ends of each of ~~said~~ the shafts.

19 (currently amended): The system of claim 13 wherein said counterweights include correction weights ~~to~~ for adding and for removing correction weights from said counterweights, and wherein said counterweights are removed when an indicated vibration is in alignment with said counterweights, and wherein counterweights are added when an indicated vibration is not alignment with said counterweights.

20 (currently amended): The system of claim 13 wherein ~~said~~ the predetermined rotor influence coefficient is obtained from an equivalent rotating machinery, and wherein an equivalent rotating machinery is a rotating machinery operating substantially at resonance.

21 (currently amended): The system of claim 13 wherein ~~said~~ the rotor influence coefficient provides a measure for adjusting said counterweights, and wherein ~~said~~ the measure is a weight adjustment per a vibration displacement and a weight placement angle value measured with respect to the location of the maximum vibration displacement.